

**MADALPINGELISED LÜLITUSAPARAADID.
OSA 6-2: MITMETOIMELISED APARAADID. JUHTIMIS-
KAITSELÜLITID**

**Low-voltage switchgear and controlgear - Part 6-2:
Multiple function equipment - Control and protective
switching devices (or equipment) (CPS)
(IEC 60947-6-2:2020 + COR1:2021)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60947-6-2:2023 sisaldab Euroopa standardi EN IEC 60947-6-2:2023 ja selle paranduse AC:2023 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60947-6-2:2023 consists of the English text of the European standard EN IEC 60947-6-2:2023 and its corrigendum AC:2023.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 03.03.2023.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 03.03.2023.
Parandusega AC lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega AC AC . Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.	The start and finish of text introduced or altered by corrigendum AC is indicated in the text by tags AC AC . The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.120.40; 29.130.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autoriõiguse kaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega:

Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about standards copyright protection, please contact the Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Low-voltage switchgear and controlgear - Part 6-2: Multiple
function equipment - Control and protective switching devices (or
equipment) (CPS)
(IEC 60947-6-2:2020 + COR1:2021)

Appareillage à basse tension - Partie 6-2: Matériels à
fonctions multiples - Appareils (ou matériel) de connexion
de commande de protection (ACP)
(IEC 60947-6-2:2020 + COR1:2021)

Niederspannungsschaltgeräte - Teil 6-2: Mehrfunktions-
Schaltgeräte - Steuer- und Schutz-Schaltgeräte (CPS)
(IEC 60947-6-2:2020 + COR1:2021)

This European Standard was approved by CENELEC on 2021-01-19. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 121A/384/FDIS, future edition 3 of IEC 60947-6-2, prepared by SC 121A "Low-voltage switchgear and controlgear" of IEC/TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60947-6-2:2023.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-12-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-03-03

This document supersedes EN 60947-6-2:2003 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60947-6-2:2020 was approved by CENELEC as a European Standard without any modification.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Low-voltage switchgear and controlgear –
Part 6-2: Multiple function equipment – Control and protective switching devices
(or equipment) (CPS)**

**Appareillage à basse tension –
Partie 6-2: Matériels à fonctions multiples – Appareils (ou matériel) de connexion
de commande de protection (ACP)**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage switchgear and controlgear –

**Part 6-2: Multiple function equipment – Control and protective switching devices
(or equipment) (CPS)**

Appareillage à basse tension –

**Partie 6-2: Matériels à fonctions multiples – Appareils (ou matériel) de connexion
de commande de protection (ACP)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.120.40; 29.130.20

ISBN 978-2-8322-9161-0

Warning! Make sure that you obtained this publication from an authorized distributor.

Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

FOREWORD.....	8
1 Scope.....	11
2 Normative references.....	11
3 Terms and definitions	12
3.1 General.....	12
3.2 Terms and definitions related to the equipment	13
3.3 Terms and definitions concerning characteristic quantities	14
3.4 Terms and definitions concerning safety aspects	15
4 Classification	16
5 Characteristics	16
5.1 Summary of characteristics	16
5.2 Type of equipment	16
5.2.1 Number of poles.....	16
5.2.2 Kind of current (alternating current or direct current)	16
5.2.3 Method of operation	16
5.2.4 Method of control	17
5.2.5 Method of resetting after overload	17
5.2.6 Method of rearming after short-circuit	17
5.3 Rated and limiting values of the main circuit	17
5.3.1 Rated voltages.....	17
5.3.2 Currents and powers	17
5.3.3 Rated frequency.....	17
5.3.4 Rated duties	17
5.3.5 Normal load and overload characteristics – Rated making and breaking capacities	18
5.3.6 Short circuit characteristics – Rated service short-circuit breaking capacity (I_{CS})	18
5.3.7 Pole impedance of a CPS (Z)	18
5.4 Utilization categories	18
5.4.1 General	18
5.4.2 Assignment of utilization categories based on the results of tests	19
5.4.3 Application of utilization categories for motor control duty	20
5.5 Control circuits.....	20
5.6 Auxiliary circuits.....	21
5.7 Relays or releases	21
5.7.1 Summary of characteristics	21
5.7.2 Types of relays or releases	21
5.7.3 Characteristic values.....	22
5.7.4 Designation and current setting of overload relays or releases	22
5.7.5 Time-current characteristics of over current relays or releases	22
5.7.6 Influence of ambient air temperature	23
6 Product information	23
6.1 Nature of information.....	23
6.1.1 Identification	23
6.1.2 Characteristics	23
6.2 Marking.....	24

6.3	Instructions for installation, operation and maintenance	25
6.4	Environmental information	25
7	Normal service, mounting and transport conditions	25
8	Constructional and performance requirements	26
8.1	Constructional requirements	26
8.1.1	General	26
8.1.2	Materials.....	26
8.1.3	Current-carrying parts and their connections.....	27
8.1.4	Clearances and creepage distances	27
8.1.5	Actuator	27
8.1.6	Indication of the contact position	28
8.1.7	Additional requirements for equipment suitable for isolation	28
8.1.8	Terminals.....	28
8.1.9	Additional requirements for equipment provided with a neutral pole	28
8.1.10	Provisions for protective earthing	28
8.1.11	Enclosures for equipment	28
8.1.12	Degrees of protection of enclosed equipment	29
8.1.13	Conduit pull-out, torque and bending with metallic conduits.....	29
8.1.14	Limited energy source.....	29
8.1.15	Stored charge energy circuit.....	31
8.1.16	Fault and abnormal conditions.....	31
8.1.17	Short-circuit and overload protection of ports	32
8.2	Performance requirements	32
8.2.1	Operating conditions	32
8.2.2	Temperature-rise	38
8.2.3	Dielectric properties	40
8.2.4	Performance under no load, normal load and overload conditions	40
8.2.5	Ability to make, carry and break short-circuit currents	46
8.2.6	Pole impedance	47
8.2.7	Leakage currents of equipment suitable for isolation	47
8.2.8	Coil power consumption	47
8.2.9	Co-ordination between a CPS and another short-circuit protective device.....	47
8.3	Electromagnetic compatibility (EMC).....	47
8.3.1	General	47
8.3.2	Immunity.....	48
8.3.3	Emission.....	48
9	Tests.....	49
9.1	Kind of tests.....	49
9.1.1	General	49
9.1.2	Type test	49
9.1.3	Routine tests.....	49
9.1.4	Sampling tests	49
9.1.5	Special tests	49
9.2	Compliance with constructional requirements.....	50
9.2.1	General	50
9.2.2	Electrical performance of screwless-type clamping units	50
9.2.3	Ageing test for screwless-type clamping units	51

9.2.4	Limited energy source test	51
9.2.5	Breakdown of components	52
9.3	Compliance with performance requirements	53
9.3.1	Test sequences	53
9.3.2	General test conditions	53
9.3.3	Performance under no load, normal load and overload conditions	53
9.3.4	Performance under short-circuit conditions	62
9.4	EMC tests	64
9.4.1	General	64
9.4.2	Immunity	65
9.4.3	Emission	70
9.5	Test sequences	71
9.5.1	General	71
9.5.2	Test sequence I: temperature-rise, operating limits, dielectric properties	73
9.5.3	Test sequence II: performance under normal load and overload conditions	76
9.5.4	Test sequence III: operational performance before and after operating sequences at conventional prospective current I_{Cr} and conventional prospective current "r" test	77
9.5.5	Test sequence IV: operational performance before and after operating sequences at I_{Cs}	78
9.5.6	Test sequence V: additional breaking capacity	79
9.5.7	Test sequence VI: additional test sequence for four-pole CPS's	80
9.5.8	Test sequence VII: additional test sequence for CPS's intended for use in an individual enclosure	80
9.5.9	Test sequence VIII: EMC	80
9.6	Routine tests	81
9.6.1	General	81
9.6.2	Operation and operating limits	81
9.6.3	Dielectric tests	81
Annex A (normative)	Special tests	82
A.1	General	82
A.2	Mechanical durability	82
A.2.1	General	82
A.2.2	Verification of mechanical durability	82
A.3	Electrical durability	84
Annex B (xxx)	Vacant	85
Annex C (normative)	Marking and identification of CPS terminals	86
C.1	General	86
C.2	Marking and identification of terminals of main circuits	86
C.2.1	General	86
C.2.2	Marking and identification of terminals of auxiliary circuits	86
Annex D (informative)	Items subject to agreement between manufacturer and user	87
Annex E (xxx)	Vacant	88
Annex F (normative)	Requirements for auxiliary contact linked with power contact (mirror contact)	89
F.1	Application and object	89
F.1.1	Application	89
F.1.2	Object	89

F.2	Terms and definitions	89
F.3	Characteristics	89
F.4	Product information	89
F.5	Normal service, mounting and transport conditions	90
F.6	Constructional and performance requirements	90
F.7	Tests	90
F.7.1	General	90
F.7.2	Tests on products in a new condition	90
F.7.3	Test after conventional operational performance (defined under Table 10).....	91
Annex G (normative)	Test sequence for CPS's for IT systems	92
G.1	General.....	92
G.2	Individual pole short circuit.....	92
G.3	Verification of dielectric withstand.....	93
G.4	Verification of overload releases.....	93
G.5	Marking.....	93
Annex H (xxx)	Vacant	94
Annex I (informative)	Glossary of symbols and graphical representation of characteristics	95
Annex J (xxx)	Vacant	96
Annex K (normative)	Procedure to determine data for electromechanical CPS used in functional safety applications	97
K.1	General.....	97
K.2	Test requirements	97
K.3	Characterization of a failure mode	97
K.4	Failure ratios of a CPS	97
Annex L (xxx)	Vacant	99
Annex M (informative)	Load monitoring indicators.....	100
M.1	General.....	100
M.2	Indicators list	100
M.3	Uncertainty	102
M.4	Tests	103
M.4.1	Routine tests.....	103
M.4.2	Type tests.....	103
Annex N (normative)	Additional requirements and tests for equipment with protective separation	105
N.1	General.....	105
N.2	Terms and definitions	105
N.3	Requirements.....	105
N.3.1	Test method for implementing protective impedance	105
N.3.2	Touch current measurement	106
Annex ZA (normative)	Normative references to international publications with their corresponding European publications	108
Bibliography		110

Figure 1 – Multiple of current setting limits for ambient air temperature time-delay overload relays or releases (see 8.2.1.5.1)	35
Figure 2 – Thermal memory test.....	37

Figure 3 – Voltage drop measurement at contact point of the clamping terminal	51
Figure 4 – Example of a pole impedance measurement for a three-pole CPS	60
Figure 5 – Representation of test current produced by back-to-back thyristors	68
Figure 6 – Test current for the verification of the influence of the current dips and interruptions	69
Figure F.1 – Mirror contact.....	90
Figure M.1 – Example of quantification of a process change	102
Figure N.1 – Protection by means of protective impedance	106
Figure N.2 – Measuring instrument.....	107
Table 1 – Utilization categories	19
Table 20 – Limits for limited energy sources without an over-current protective device	30
Table 21 – Limits for limited energy sources with an over-current protective device	30
Table 22 – Limits for limited energy source with current limiting impedance.....	31
Table 2 – Limits of operation of inverse time-delay overload relays or releases when energized on all poles	34
Table 3 – Trip classes of overload relays or releases for utilization categories AC-2, AC-3, AC-3e, AC-4, DC-3, DC-5.....	35
Table 4 – Limits of operation of three-pole inverse time-delay overload relays or releases when energized on two poles only	36
Table 5 – Temperature-rise limits of terminals	38
Table 6 – Temperature-rise limits for insulated coils in air.....	39
Table 7 – Intermittent duty test cycle data	39
Table 8 – Rated making and breaking capacities – Making and breaking conditions corresponding to the utilization categories	41
Table 9 – Relationship between current broken I_C and OFF-time for the verification of rated making and breaking capacities.....	42
Table 10 – Conventional operational performance after making/breaking capacity tests – Making and breaking conditions according to utilization category	44
Table 11 – Operational performance before and after short-circuit tests at I_{Cr} and I_{CS} – Making and breaking conditions according to utilization category	45
Table 12 – Value of the prospective test current according to the rated operational current.....	46
Table 13 – Value of the prospective test current according to the rated operational current (harmonized table)	47
Table 14 – Performance criteria when EM disturbances are present.....	48
Table 15 – EMC immunity tests	65
Table 16 – Test parameters for harmonics and interruptions	69
Table 17 – Terminal disturbance voltage limits for conducted radio-frequency emission (for mains ports)	70
Table 18 – Radiated emission test limits.....	71
Table 19 – Test sequences	71
Table F.1 – Test voltage according to altitude.....	91
Table G.1 – Individual pole	92
Table K.1 – Failure mode of CPS	97
Table K.2 – Typical failure ratios for CPS	98

Table M.1 – AC monitoring indicators list.....	101
Table M.2 – Different possibilities authorized for verification of indicators	103
Table M.3 – Reference for verification conditions.....	104
Table M.4 – Harmonic levels	104

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 6-2: Multiple function equipment –
Control and protective switching devices (or equipment) (CPS)**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60947-6-2 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low-voltage.

This third edition cancels and replaces the second edition published in 2002 and its Amendment 1:2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- editorial changes according to ISO/IEC directives Part 2,
- alignments with IEC 60947-1:2020:
 - markings ("s", "sol", "r" or "f");
 - constructional requirements including material requirements;
 - requirements for screwless terminals;

- measurement method of the pole impedance;
- EMC requirement and testing;
- procedure to determine data for electromechanical CPS's used in functional safety applications;
- harmonisation with IEC 60947-2:2016:
 - operation tests of under-voltage relays and shunt releases;
 - CPS for IT systems (Annex G);
 - coordination with other short-circuit protective devices;
- alignments with IEC 60947-4-1:2018:
 - test at the rated conditional short-circuit current I_q of protected switching devices;
 - short-circuit tests harmonisation with North America;
 - reliability data for functional safety applications (new Annex K);
 - safety aspects related to electronic circuits and protective impedance (new Annex N);
 - introduction of provisions covering the impact of higher locked rotor current to achieve high efficiency class;
 - mention of dedicated wiring accessories;
 - definitions and measurement method of the power consumption of the control circuit during holding and pick-up operations;
 - load monitoring indicators (new Annex M).

The text of this International Standard is based on the following documents:

FDIS	Report on voting
121A/384/FDIS	121A/392/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 60947 series, under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

This document shall be read in conjunction with IEC 60947-1, *Low voltage switchgear and controlgear – Part 1: General rules*.

The provisions of the general rules are applicable to this part of IEC 60947-6, where specifically called for. General rules clauses and subclauses thus applicable as well as tables, figures and annexes are identified by reference to IEC 60947-1, for example, 1.2.3, Table 4, or Annex A of IEC 60947-1:2020.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

The contents of the corrigenda 1 (2021-12) and 2 (2023-06) have been included in this copy.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 6-2: Multiple function equipment – Control and protective switching devices (or equipment) (CPS)

1 Scope

This document applies to control and protective switching devices (or equipment) (CPS), the main contacts of which are intended to be connected to circuits of rated voltage not exceeding 1 000 V AC or 1 500 V DC.

It covers control and protective switching device (CPS):

- which provides protective and control functions for circuits and motors;
- where its control function is operated exclusively otherwise than by hand;
- which provides continuity of service after over-current conditions; and
- which can have additional functions, such as isolation or communication.

This document does not apply to:

- auxiliary contacts, covered by IEC 60947-5-1;
- CPS used downstream to frequency drive¹;

NOTE Additional requirements for CPS used downstream to frequency drive are under consideration for the next maintenance cycle.

- the use of the product with additional measure within explosive atmospheres, covered by IEC 60079 (all parts);
- embedded software design rules, covered by IEC TR 63201;
- cyber security aspects, covered by IEC TS 63208.

The object of this document is to state:

- the characteristics of CPS's;
- the conditions with which CPS's are complying with reference to their operation and behaviour, their dielectric properties, the degree of protection provided by their enclosure where applicable, its construction including safety measures against electric shock, fire hazard and mechanical hazard;
- the tests intended to verify that these conditions have been met, and the methods to be adopted for these tests;
- the information to be marked on or given with the CPS's.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

¹ For this subject, the manufacturer is responsible to take additional safety measures.

IEC 60034-1:2017, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

IEC 60617, *Graphical symbols for diagrams* (available at <http://std.iec.ch/iec60617>)

IEC 60715:2017, *Dimensions of low-voltage switchgear and controlgear – Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories*

IEC 60730-1, *Automatic electrical controls – Part 1: General requirements*

IEC 60947-1:2020, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-2:2016, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*
IEC 60947-2:2016/AMD1:2019

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

IEC 61051-2, *Varistors for use in electronic equipment – Part 2: Sectional specification for surge suppression varistors*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016
CISPR 11:2015/AMD2:2019

CISPR 32, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

ISO 3864-2, *Graphical symbols – Safety colours and safety signs – Part 2: Design principles for product safety labels*

3 Terms and definitions

3.1 General

For the purposes of this document, the terms and definitions of Clause 3 of IEC 60947-1:2020, as well as the following terms, definitions, symbol and abbreviations apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>